

POINT TO POINT



ALS Series provides Native IP and Native PDH and SDH connections; it is the ideal solution for a wide range of applications in access networks and backbone areas, covering any market segment ranging from cost-sensitive applications to advanced network implementations in which high capacities, complex protection schemes and excellent reliability are mandatory.

Its superior mix of packet and TDM interfaces allows easy network evolution from pure TDM to pure IP.

A complete range of user interfaces (E1, Gigabit/Fast Ethernet and STM1) and a high degree of versatility allow very easy network planning and management.

ALS series includes nodal configuration for crowded stations where many different hops are converging; it allows a drastic reduction of equipment complexity both in terms of units counts and physical connections.

ALS is available in all frequency bands from 4 to 43 GHz in single or duplicated configuration, with radio capacity up to 1.6 Gbps.

XPIC functionality is available for high capacity cross-polar implementations.

ALS

PDH/SDH/ Ethernet Series



siae microelettronica



ALS

PDH/SDH/Ethernet Series PDH/SDH/Ethernet Series
PDH/SDH/Ethernet Series

PDH/ SDH/Ethernet *Series*

MAIN FEATURES

- > Advanced Microwave Technology
- > Base-Band high circuit integration
- > Reduced power consumption
- > Excellent radio-electrical performance
- > Full software approach:
 - Modulation and radio capacity
 - Adaptive modulation
 - Alarm/performance monitoring
 - Fault analysis
 - Availability of O&M Tools (Loop activation, switch manual forcing, etc.)
- > Interchangeable modules
- > Easy configuration upgrade
- > Mixed TDM and Ethernet interfaces
- > Synchronous Ethernet support
- > Reduced OPEX (high reliability and fast restoration of replaceable Units)
- > Extended environmental compatibility
- > Extreme compactness and lightness
- > Optimized mechanical solutions
- > Complete compatibility and inter-operability with all SIAE MICROELETRONICA's equipment
- > Integrated antennae up to 1.8 m

L2 SWITCH FUNCTIONALITIES

- > MAC Address switching, ageing and learning
- > VLAN / VLAN STACKING (IEEE 802.1q with QinQ)
- > Ethernet QoS (IEEE 802.1p)
- > Flow Control (IEEE 802.3x)
- > IP-V4 ToS / IP-V6 TC
- > Jumbo Frames
- > RMON Statistic
- > CIR
- > LLF (Link Loss Forwarding)
- > Link aggregation (IEEE 802.3ad)
- > ETH OAM (IEEE 802.1ag/ITU-T Y 1731)
- > MSTP (IEEE 802.1w)

NODAL CONFIGURATION

In a Nodal Station the cross-connection functionality can be distributed over a configuration of up to eight different IDUs, and each one can manage up to two or four different ODU's (depending on IDU type). Connections among IDUs are ring protected. Failing one IDU, no other IDU in the node is affected by loss of traffic.

Thanks to the IDU scalable approach and user friendly software management, it is possible to build up a nodal configuration through incremental expansions (from one up to twelve or sixteen different directions) with a reduced initial investment.

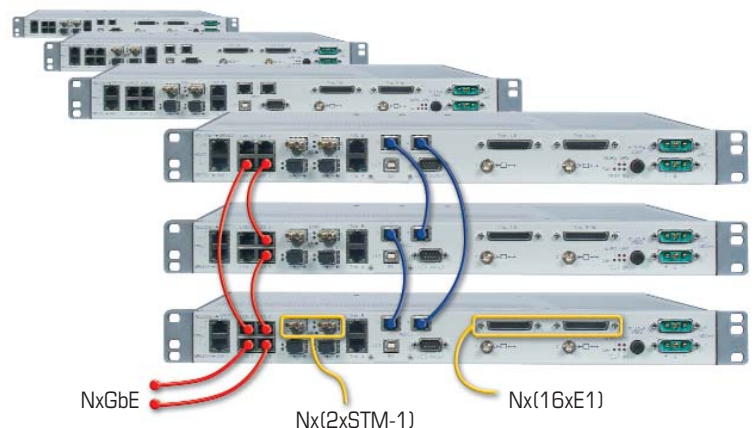
TYPICAL APPLICATIONS

The ALS series has been conceived and designed to cover a wide range of applications, such as:

- > 2G / 3G / LTE Cellular Network Infrastructure
- > 10/100/1000 Mbit/s Ethernet connections
- > WiMAX backhauling
- > Private data Networks (WANs, LANs, etc.)
- > Utility Networks (Railways, Pipelines, etc.)
- > Back-up transmission medium to Fibre Optic links
- > Spur Links for Backbones/Rings
- > Last Mile Fibre Extension
- > Leased Lines Replacement
- > SDH Radio Ring Deployment up to 4xSTM-1
- > High Capacity Broadband Access Networks

NETWORK MANAGEMENT

- > SNMP Agent protocol with "Full IP" or "OSI+IP" stack
- > Messages Routing: static, OSPF, IS-IS
- > Local Craft Terminal (LCT)/WEB LCT interface: USB (BType)
- > Network management System (NMS) interface:
 - Ethernet 10BASE-T
 - RS232 (only for modular versions)
 - EOC (PDH applications)
 - Out band and In-Band communication
 - DCC byte for STM-1 traffic (SDH applications)





OUTDOOR UNIT



Two ODU versions are available:
 AL for PDH/Ethernet applications and AS for PDH/SDH/Ethernet applications

- > Light weatherproof (IP65) box
- > Easy and quick deployment
- > Full software programmability of main RF parameters
- > Extended (Software) frequency agility
- > Configuration, capacity and modulation independent
- > Excellent short and long term frequency stability
- > Built-in ATPC functionality
- > RF Loop

INDOOR UNIT

Several IDU models are available to fit any application:

PDH SDH ETHERNET Medium & High Capacity

IDU Model	PDH - IP Solutions AL / ALplus	SDH - IP Solutions ALS	PDH - SDH - IP Solutions ALplus2
IDU 1RU (1 rack unit) - Compact Version			
Configuration	1+0 / 1+1	1+0 / 1+1 / 2x(1+0)	1+0 / 1+1 2x(1+0) / XPIC
TDM Transmission Capacity	Up to 32xE1	1xSTM1 / 2xSTM1 / 63-126xE1*	Up to 80xE1 per radio channel
Ethernet Throughput Capacity	Up 100 Mbps	-	Up to 400 Mbps (800 with XPIC)
Modulation	4 to 32QAM	32 and 128QAM	4 to 256QAM with 8 ACM
Tributary interfaces	16xE1 + 3xFE 32xE1 + 3xFE	2xSTM1	(16+2)xE1 + STM1 (1+1 MSP) (32+2)xE1 + STM1 (1+1 MSP) TDM Cross Connection capability 2x(FE / GE) Electrical + 2xGE Optical/Electrical Synchronous Ethernet Support
Maintenance Interfaces	2x10BaseT + USB + RS232 + G704 (E1)	2x10BaseT + USB + RS232	2x10BaseT + USB + G704 (E1)
IDU 1RU (1 rack unit) - Modular Version			
Configuration	1+0 / 1+1	1+0 / 1+1 / 2x(1+0)	1+0 / 1+1 / 2x(1+0)
TDM Transmission Capacity	Up to 32xE1	1xSTM1 / 2xSTM1 / 4xSTM1	Up to 80xE1 (per radio channel)
Ethernet Throughput Capacity	Up 100 Mbps	155 / 310 / 620 Mbps	Up to 400 Mbps (per radio channel)
Modulation	4 to 32QAM	32 and 128QAM	4 to 256QAM with 8 ACM
Tributary interfaces	32xE1 24xE1 + 4xFE	2xSTM1 4xSTM1 8xE1 + 2xFE + 1xGE	16xE1+ STM1 (1+1 MSP) TDM Cross Connection capability 1x(FE / GE) Electrical/Optical + 1x(FE / GE) Electrical + 1xGE Optical
Maintenance Interfaces	2x10BaseT + USB + RS232 + G704 (E1)	2x10BaseT + USB + RS232	2x10BaseT + USB + RS232 + G704 (E1)
IDU - Nodal			
Configuration	Modular 2RU 1+0 / 1+1 / 2x(1+1) Drop/Insert	Modular 2RU 1+0 / 1+1 / 2x(1+0) / 2x(1+1)	Nx1RU Nx(1+0), Nx(1+1) Drop/Insert Nx2x(1+0), Drop/Insert
TDM Transmission Capacity	Up to 53xE1	1xSTM1 / 2xSTM1 / 4xSTM1	Up to 80xE1 (per radio channel)
Ethernet Throughput Capacity	Up 100 Mbps	145 / 290 / 580 Mbps	Up to 400 Mbps (per radio channel) (800 with XPIC)
Modulation	4 to 32QAM	32 and 128QAM	4 to 256QAM with 8 ACM
Tributary interfaces	53xE1 53xE1 + 4xFE 2xSTM1 + 16xE1 + Nodal Connection 2xSTM1 + 16xE1 + 1xFE + 1xGE + Nodal Connection	2xSTM1 4xSTM1 8xE1 + 2xFE + 1xGE	NxSTM1 Nx16E1 Nx(2FE / GE) TDM Cross Connection capability Synchronous Ethernet Support
Maintenance Interfaces	2x10BaseT + USB + RS232 + G704 (E1)	2x10BaseT + USB + RS232	2x10BaseT + USB + G704 (E1)

* With Expansion Box



IDU 1RU
up to 800 Mbps



IDU 1RU
up to 2x400 Mbps



IDU 1RU / NODAL
up to Nx800 Mbps



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ALS

PDH/SDH/Ethernet Series

Technical Specifications (*)

Frequency Band		4 GHz	6L/6U GHz	7/8 GHz	10/11 GHz	13 GHz	15 GHz	18 GHz	23 GHz	25 GHz	28 GHz	32 GHz	38 GHz	43 GHz
Frequency Range		4.4-5.0	5.9-7.1	7.11-8.5	10.2-11.7	12.75-13.25	14.4-15.35	17.7-19.7	21.2-23.6	24.5-26.5	27.5-29.5	31.8-33.4	37-39.5	40.5-43.5
Channel Spacing	4 QAM	4 Mbits (3.5 MHz BW) to 100 Mbits (56 MHz)												
	8 QAM	18 Mbits (7MHz BW) to 150 Mbits (56 MHz)												
	16 QAM	8 Mbits (3.5 MHz BW) to 200 (56 MHz BW)												
	32 QAM	30 Mbits (7 MHz BW) to 240 Mbits (56 MHz BW)												
	64 QAM	38 Mbits (7MHz BW) to 290 Mbits (56 MHz BW)												
	128 QAM	42 Mbits (7 MHz BW) to 340 Mbits (56 MHz BW)												
	256 QAM	50 Mbits (7 MHz BW) to 400 Mbits (56 MHz BW)												
Supported Configurations	Terminal applications	1+0 / 1+1 MHSB / 1+1 SD / 1+1 FD / 2+0 / 2x(1+1)												
	Nodal applications	Up to 8x(1+1) or up to 12x(1+1) or up to 16x(1+0)												
Modulation Schemes		4 QAM / 8 QAM / 16 QAM / 32 QAM / 64 QAM / 128 QAM / 256 QAM												
Supported Capacities		2xE1 / 4xE1 / 5xE1 / 8xE1 / 10xE1 / 16xE1 / 21xE1 / 32xE1 / 42xE1 / 53xE1 / 1xSTM1 / 2xSTM1 / 4xSTM1 (with XPIC)												
Ethernet Throughput		From 4 to 800 Mbps per radio channel												
Output Power at Point C' (dBm)**														
AL ODU / AS ODU	4 QAM	+29/-	-/+29	+27/+29	+25/+28	+25/+28	+25/+28	+20/+23	+20/+23	+20/+22	+19/+21	+17/+20	+17/+19	-/+17
	8 QAM	-	-/+29	-/+29	-/+28	-/+28	-/+28	-/+23	-/+23	-/+22	-/+21	-/+20	-/+19	-/+17
	16 QAM	+24/-	-/+26	+22/+26	+20/+25	+20/+25	+20/+25	+15/+21	+15/+21	+15/+20	+14/+19	+13/+18	+13/+17	-/+15
	32 QAM	+23/-	-/+26	+20/+26	+20/+25	+20/+25	+20/+25	+15/+21	+15/+21	+15/+20	+14/+19	+13/+18	+13/+17	-/+15
	64 QAM	-	-/+25	-/+25	-/+24	-/+24	-/+24	-/+19	-/+19	-/+18	-/+17	-/+16	-/+15	-/+13
	128 QAM	-	-/+25	-/+25	-/+24	-/+24	-/+24	-/+19	-/+19	-/+18	-/+17	-/+16	-/+15	-/+13
	256 QAM	-	-/+24	-/+24	-/+23	-/+23	-/+23	-/+18	-/+18	-/+17	-/+16	-/+15	-/+14	-/+12
	Receiver Sensitivity (dBm) at BER 10 ⁻⁶ at Point C (1+0 conf., 28 MHz BW, RF filter losses included)													
AL, ALplus, ALS / ALplus2 (see Indoor Unit Table)	4 QAM	-85/-	-83/-89,5	-83/-89,5	-82,5/-89	-82,5/-89	-82,5/89	-82/-88,5	-82/-88,5	-81,5/-88	-81/-87,5	-80/-86	-80,5/-86,5	-85,5
	8 QAM	-	-/-82,5	-/-82,5	-/-82	-/-82	-/-82	-/-81,5	-/-81,5	-/-81	-/-80,5	-/-79	-/-79,5	-78,5
	16 QAM	-78/-	-76/-81	-76/-81	-75,5/-80,5	-75,5/-80,5	-75,5/-80,5	-75/-80	-75/-80	-74,5/-79,5	-74/-79	-73/-77,5	-73,5/-78	-77
	32 QAM	-76/-	-74/-77,5	-74/-77,5	-73,5/-77	-73,5/-77	-73,5/-77	-73/-76,5	-73/-76,5	-72,5/-76	-72/-75,5	-71/-74	-71,5/-74,5	-73,5
	64 QAM	-	-/-75,5	-/-75,5	-/-75	-/-75	-/-75	-/-74,5	-/-74,5	-/-74	-/-73,5	-/-72	-/-72,5	-71,5
	128 QAM	-	-70,5/-73,5	-70,5/-73,5	-70/-73	-70/-73	-70/-73	-69,5/-72,5	-69,5/-72,5	-69/-72	-68,5/-71,5	-67,5/-70	-67,5/-70,5	-69,5
	256 QAM	-	-/-70,5	-/-70,5	-/-70	-/-70	-/-70	-/-69,5	-/-69,5	-/-69	-/-68,5	-/-67	-/-67,5	-66,5
	Frequency Stability		± 5 ppm											
Frequency Agility		250 KHz (software programmable), 125 KHz on request												
RTPC		Up to 30 in 1 dB steps												
ATPC		Up to 20/40 dB in 1 dB steps												
Management Interfaces		RS232C, USB, Ethernet 10 BASE-T (TMN)												
IDU/DDU Interconnection (per terminal)		50 Ω Coaxial Cable per RT												
Dimensions (W x H x D)	1RU Compact IDU	480 x 45 x 212 (mm)												
	1RU Modular IDU	480 x 45 x 270 (mm)												
	2RU Modular IDU	480 x 90 x 270 (mm)												
	AL ODU 1+0	254 x 254 x 114 (mm)												
	AS ODU 1+0	254 x 254 x 154 (mm)												
Power Supply		-48 Vdc (-15%, +20%)												
Power Consumption (per Terminal) Compact Version	1+0 configuration	ALC-ALCplus				ALS-C				ALCplus2				
	1+1 configuration	≤ 34 W				≤ 42 W				≤ 50W				
Environmental Performance	ODU Weather Proofing Class	IP65												
	ODU Temperature Range	-5 °C to +50 °C												
	ODU Temperature Range	-35 °C to +55 °C												
Compliant with		ETSI EN 302 217												

(*) Typical values

(**) Nominal values according to ETSI